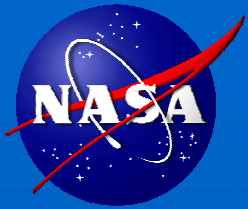


# MathTrax 🌟

An Accessible Data Visualization Tool  
for the GLOBE Community

NASA JSC Learning Technologies

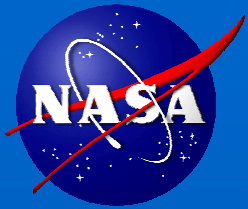
<http://prime.jsc.nasa.gov/>



# MathTrax 🍌

An Accessible Data Visualization Tool for the GLOBE Community

- MathTrax is a math and science teaching tool that can be used by the GLOBE community for data visualization
- It's based on the Math Description Engine (MDE) which is a software library that can be used to build many types of accessible math and science tools
- MathTrax and the MDE technology provide another modality to engage students in a learning experience
- These technologies can be integrated into the GLOBE curriculum to make visual math and science content accessible to blind and sighted students



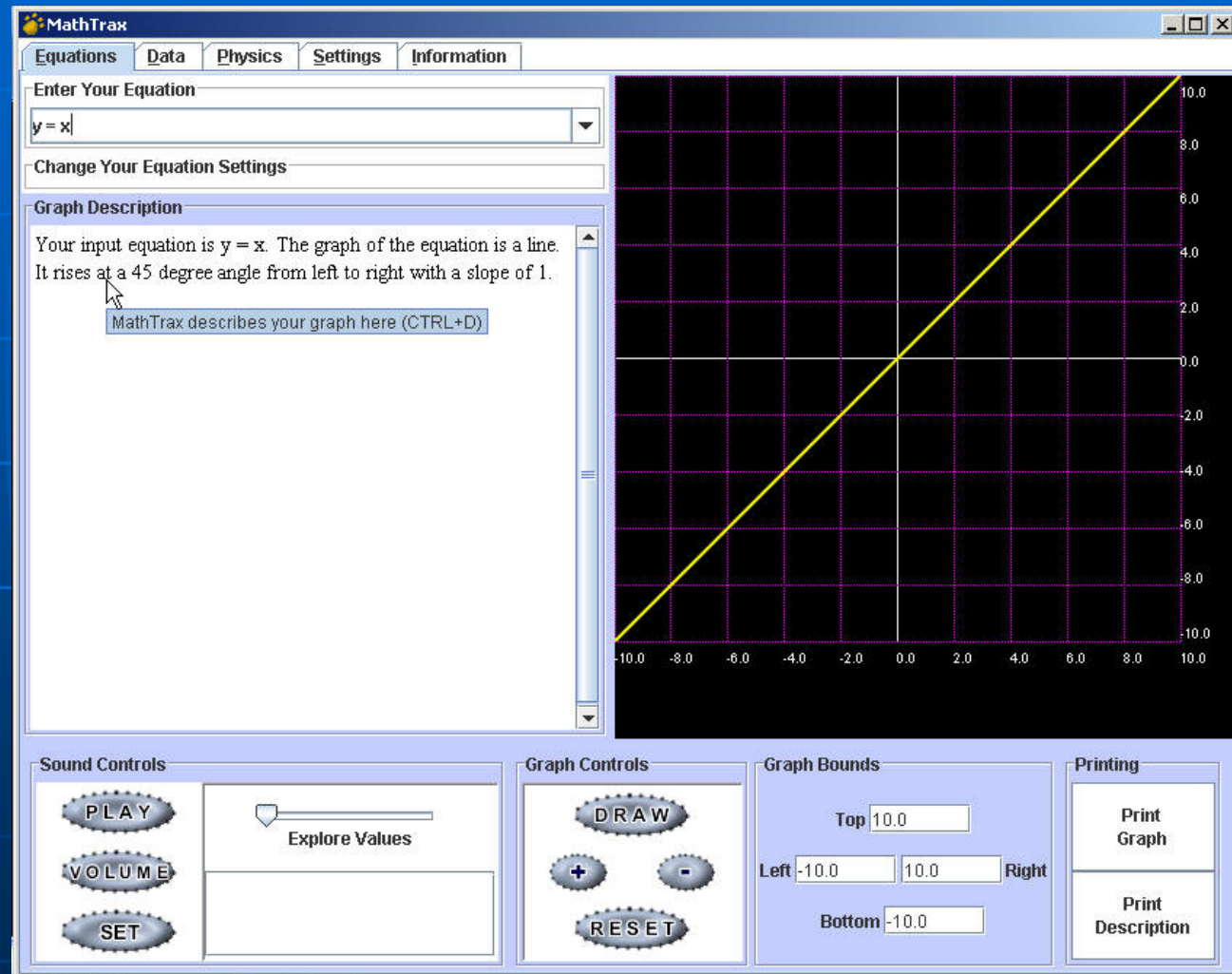
# MathTrax 🐾

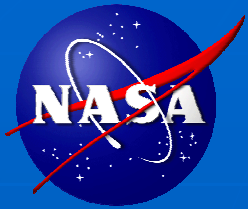
An Accessible Data Visualization Tool for the GLOBE Community

MathTrax can be used three ways:

1. Students use MathTrax to graph equations

■ Data represented by MathTrax can be heard and read using the text descriptions and sonifications MathTrax provides



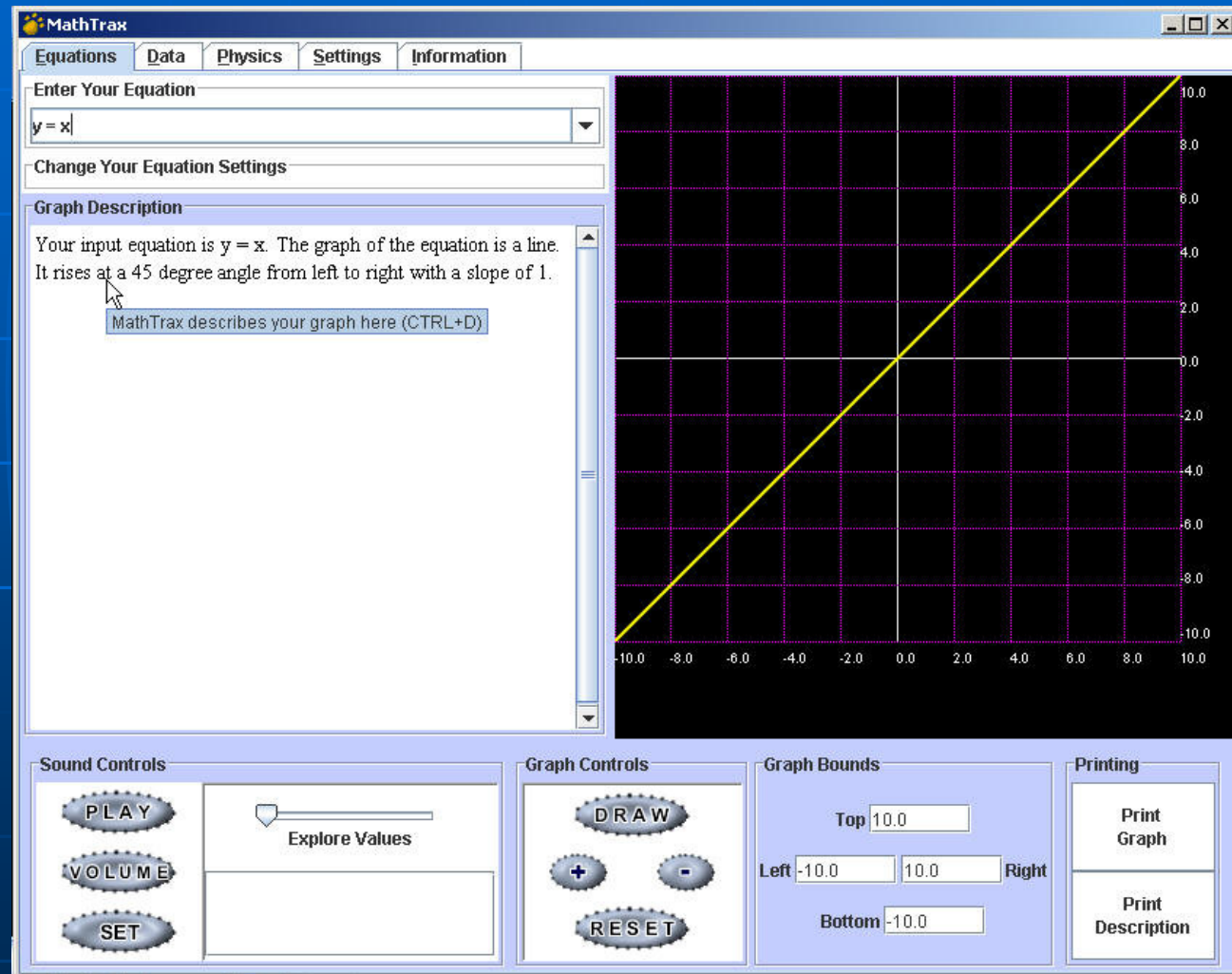


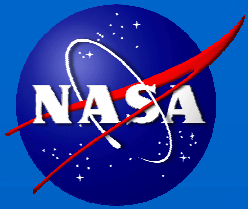
# MathTrax 🐾

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- Textual descriptions of the graph are heard using a screenreader such as JAWS

"Your input equation is  $y=x$ . The graph of the equation is a line. It rises at a 45 degree angle from left to right with a slope of 1."

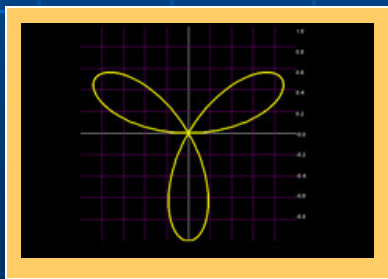




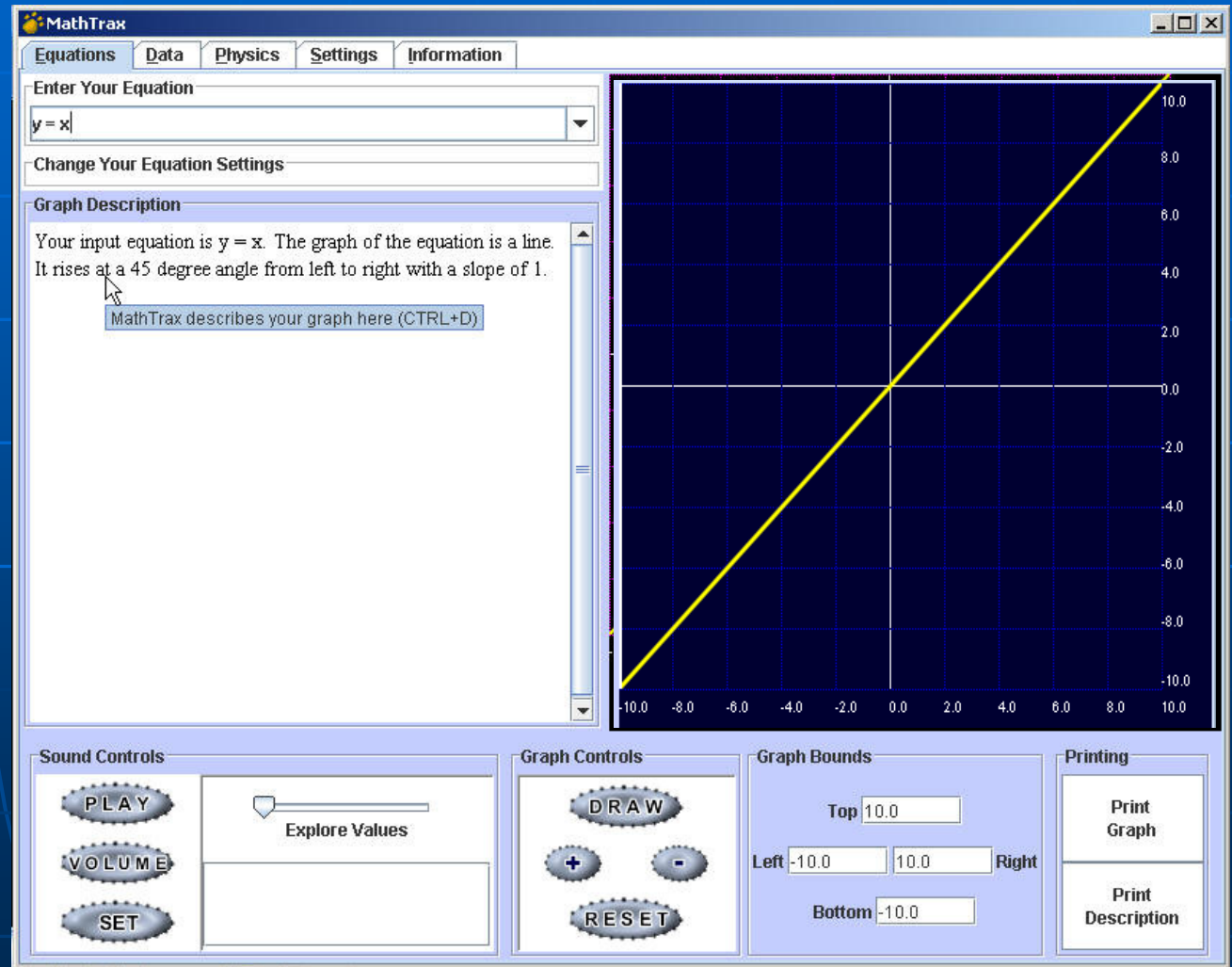
# MathTrax 🌟

An Accessible Data Visualization Tool for the GLOBE Community

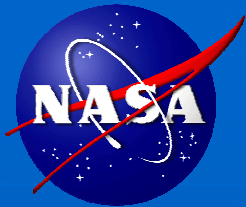
- The shape of the graph can be heard by pushing the “Play” button at the bottom left of the screen



What do you think this graph would sound like?



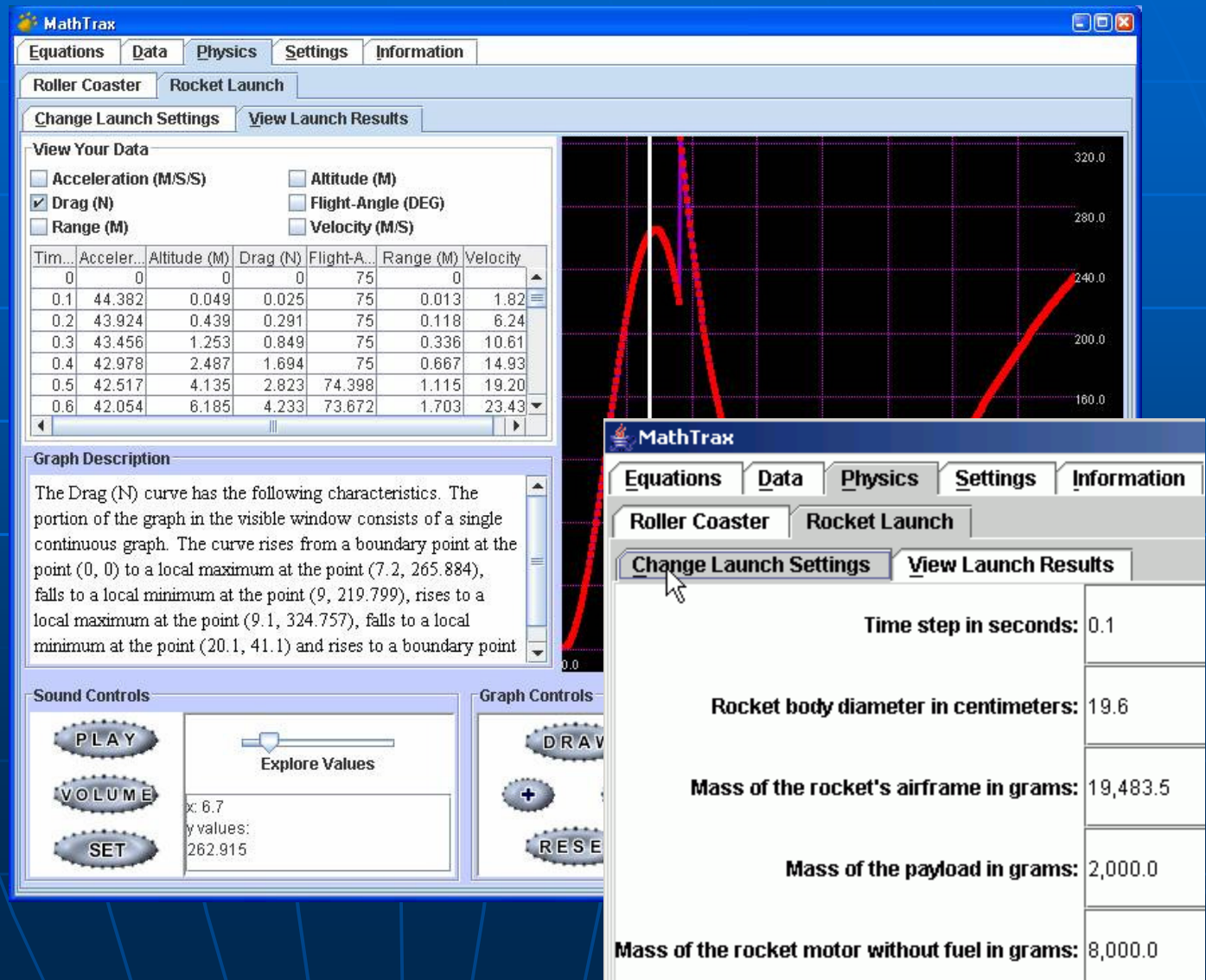


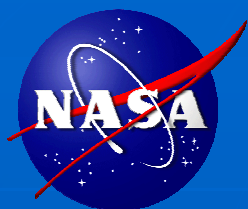


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2. Students can use MathTrax to construct and analyze physics simulations such as a roller coaster car on a track or a rocket launch



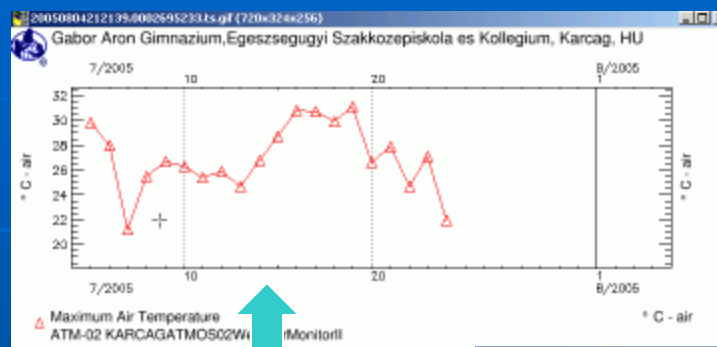


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3. Students can import time series data files into MathTrax and listen to the descriptive information about that data

■ This is an accessible method for analyzing visual GLOBE data

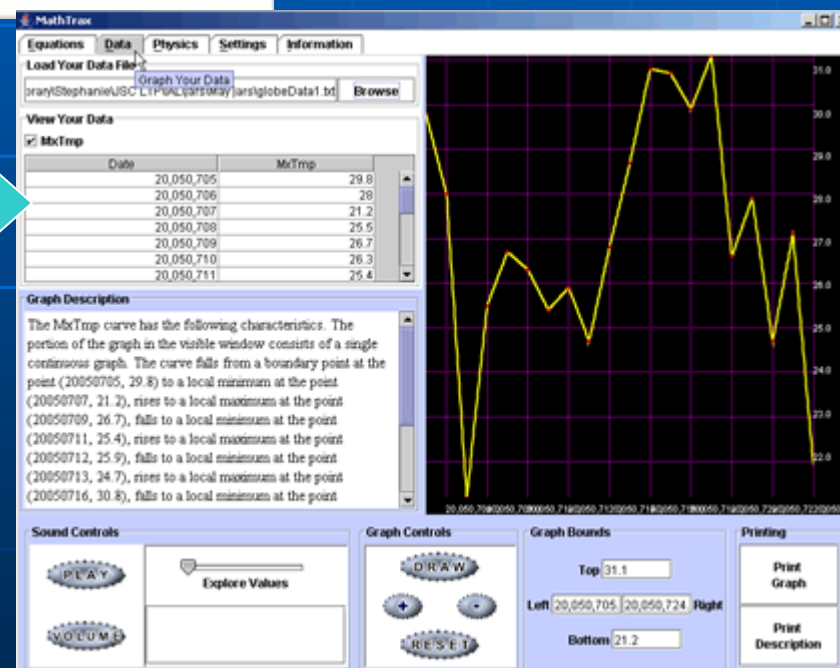


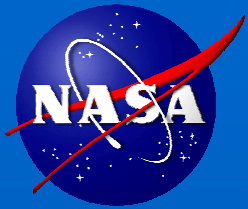
To the left is a GLOBE graph. Below is the same GLOBE time series data imported into MathTrax providing text descriptions and sonification of the graph.

20 dates in this time series

[Date\[+\]](#) [MxTmp](#) [ATYP](#)  
YYYYMMDD deg C

20050705	29.8	4
20050706	28.0	4
20050707	21.2	4
20050708	25.5	4
20050709	26.7	4
20050710	26.3	4
20050711	25.4	4
20050712	25.9	4
20050713	24.7	4
20050714	26.8	4
20050715	28.7	4
20050716	30.8	4
20050717	30.7	4
20050718	29.9	4
20050719	31.1	4
20050720	26.6	4



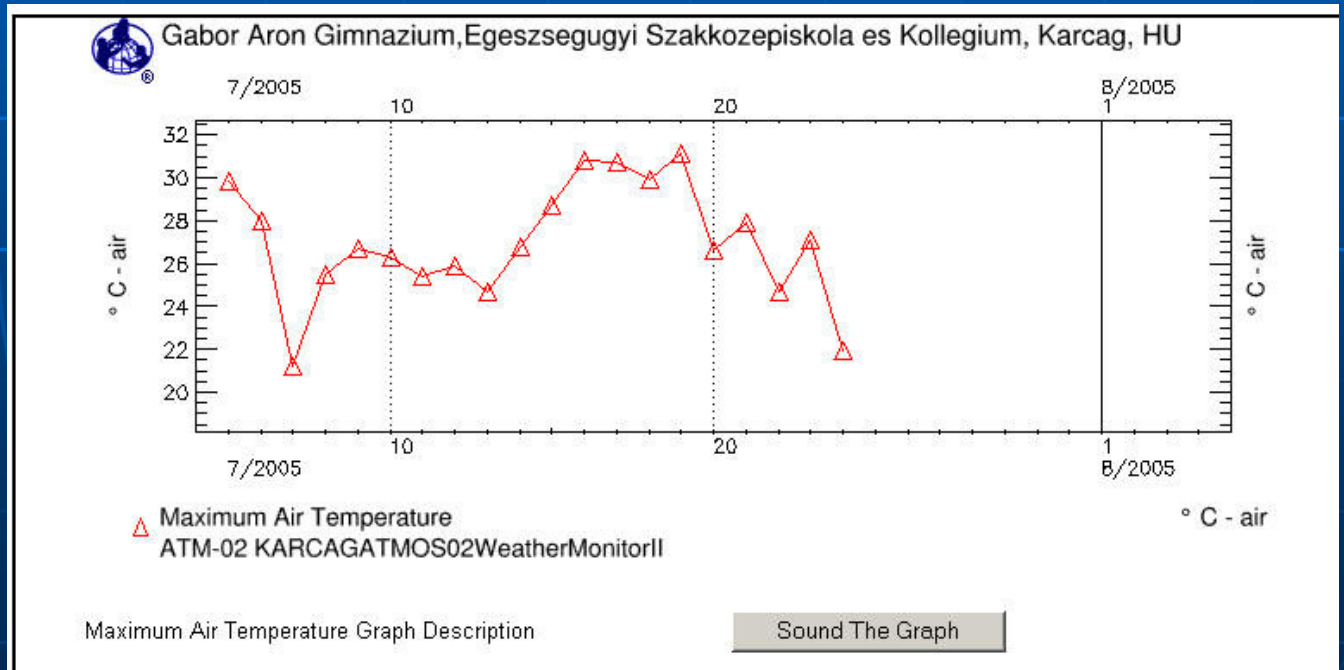


# MathTrax 🌟

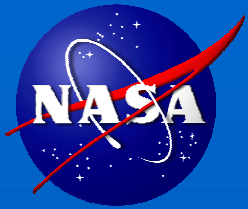
An Accessible Data Visualization Tool for the GLOBE Community

- The MDE modules that underlie and power MathTrax can also be used in different combinations to create customized views of data
- Each MDE module can be embedded into an application

Here we see a GLOBE graph of the same time series data that charts air temperature over the course of several days. Note the button below the graph "Sound the Graph". This is an example of the MDE sonification module embedded within the GLOBE environment. When clicked, the user can hear an accessible rendering of the graph using sonification.







# MathTrax 🐾

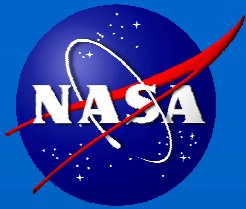
An Accessible Data Visualization Tool for the GLOBE Community

Our goal is to help you integrate MathTrax and the MDE technology into your GLOBE curriculum to make earth science data accessible to blind and low vision students, ADD students, formal and informal ed students, gifted students, sighted students – all students

Where can you get your hands on this fabulous (free) technology?????

We're glad you asked.....






# MathTrax 🐾


An Accessible Data Visualization Tool for the GLOBE Community

MathTrax – <http://prime.jsc.nasa.gov/mathtrax/>

**NATIONAL AERONAUTICS  
AND SPACE ADMINISTRATION**

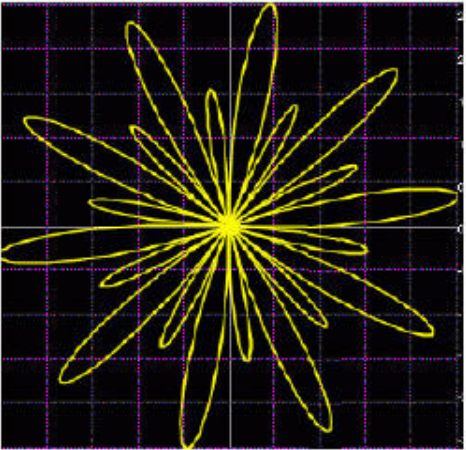
[+ Visual Home](#)  
[+ Text Home](#)  
[+ Developers](#)

Learning Technologies

**MATHTRAX 🐾**


Accessible Math and Science for  
6th-12th Grade Students

[MathTrax works  
with screen-  
readers!](#)



[Tell Us How You Use MathTrax!](#)

**MathTrax and the MDE SDK were  
selected as a 2006 NASA  
Software of the Year runner-up!  
Thanks for your support!!**

 MathTrax is a graphing tool for middle school  
and high school students to graph equations,  
physics simulations or plot data files. The graphs  
have descriptions and sound so you can hear and  
read about the graph. Blind and low vision users  
can access visual math data and graph or  
experiment with equations and datasets.

[The MathTrax website  
has two modes:](#)  
  
[Visual MathTrax](#)  
  
[Text MathTrax](#)

[+ FAQ](#)  
[+ Feedback](#)  
[+ Site Map](#)  
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[+ NASA Official: Robert Shelton](#)  
[+ Curator: Stephanie Smith](#)  
[+ Last Update: October 12, 2006](#)  
[+ Contact NASA MathTrax](#)



# MathTrax 🍌

An Accessible Data Visualization Tool for the GLOBE Community

Math Description Engine – <http://prime.jsc.nasa.gov/mde/>

**NATIONAL AERONAUTICS  
AND SPACE ADMINISTRATION**

+ Accessibility  
+ No Frames

+ Information Accessibility Lab  
+ MathTrax  
+ Visit NASA.gov  
+ Contact NASA

**Math Description Engine**  
**Software Development Kit**

The graph of the equation is a line.  
It rises gradually from left to right  
with a slope of 1/2.


Downloads  
Documentation  
Demos  
Home

**MDE Overview**


*"With about 100,000 blind and visually impaired students in the U.S., there is a growing need for alternative methods to teach visual subjects.", National Federation of the Blind Press Release*

The Math Description Engine Software Development Kit can be used by software developers to make computer-rendered graphs more accessible to blind and visually-impaired users. It has a simple API that lets you easily add alternative text and sound descriptions to your graphs.

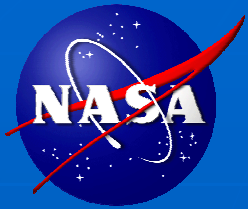
Version 1 of the MDE SDK generates text descriptions for 2D graphs commonly seen in math and science curriculum (and practice). The mathematically rich text descriptions can also serve as a virtual math and science assistant for *blind and sighted users*, making graphs more accessible for everyone.

**FIRST GOV**  
Your First Click to the U.S. Government

+ Freedom of Information Act  
+ The President's Management Agenda  
+ FY2002 Agency Performance Report



Author: Terry Hodgson  
NASA Official: Robert O. Shelton  
Last Updated: October 4, 2006



# MathTrax 🌟

An Accessible Data Visualization Tool for the GLOBE Community

For assistance and more information:

[jsc-nasa-learning-technologies@mail.nasa.gov](mailto:jsc-nasa-learning-technologies@mail.nasa.gov)

MathTrax and the MDE are products of the  
Information Accessibility Lab  
NASA JSC Learning Technologies

Thank You!